BIOTECHNOLOGY - RESPONSIBILITY AND REWARDS.

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Australian cottongrowers hold a privileged position in agriculture in this country - with the exception of blue carnation growers, cottongrowers are the only farmers with the legal right to grow genetically modified (GM) crops. Following a tentative start in 1996, insect and herbicide resistant cottons now make up nearly 90 percent of our plantings. The benefits of gene technology in cotton have been substantial, but sadly for other crop producers, access to this technology has been completely halted through agricultural censorship based on misinformation and political maneuvering

Australia began the biotechnology era at the head of the pack, as we have always with beneficial new technologies. Sadly however, we are now an also-ran as a biotech country. This is mainly due to unscientific and politically motivated decisions by many of Australia's State governments. It is a situation that must be addressed. The most recent statutory review of the Office of the Gene Technology Regulator (OGTR), the agency charged with the responsibility of regulating gene technology products at the Federal level, has identified State moratoria as an issue holding back proper development of gene technology crops in Australia.

The privilege to use gene technology bears responsibilities and rewards. Rewards come in many forms, including reduced chemical applications, improved integrated pest management, and life style advantages. The rewards lead to benefits for the environment, farming operations, and people. The rewards from being at the leading edge of technology adoption have given us an advantage over our global competitors, many of whom are heavily subsidized and not confronted with the ever increasing commercial and environmental pressures that the Australian industry is subjected to.

The responsibilities for cotton producers include:

- managing this technology so as to prevent the development of weed and insect resistance, thus ensuring the longevity and sustainability of the technology
- managing the current technology responsibly to ensure that our industry has access to all the new and exciting developments that are currently being researched in laboratories around the world.
- Responsibility to the Australian community and our fellow farmers to highlight the benefits of access to this technology so that we, and they, can remain competitive in our other agricultural endeavors.

Looking more closely at our immediate responsibilities, one immediate priority is the management of resistance to glyphosate in cotton systems. In many ways, this is probably the easiest of our responsibilities. Besides in crop cultivations, fields are always cultivated through the winter, and knockdown herbicide before planting needs to be alternative chemistry to glyphosate if Roundup Ready cotton was the last crop. Our industry would benefit from an agreed and robust best management practice regime to avoid resistance build up to glyphosate. In addition, Liberty Link technology offering crop resistance to a different herbicide will be available in increasing quantities providing a further circuit breaker for resistance management through chemical group rotation

Our most serious threat of resistance will be from weeds that have developed resistance in farming systems other than cotton. It is reasonable to argue that cotton farming systems will reduce the potential of glyphosate resistance.

Insect resistant Bollgard cottons have been an outstanding development in biotechnology. They have freed us from dependence on traditional chemistry and have opened up exciting new pest management systems allowing greater utilisation of natural predators in insect control, and by reducing our dependence on chemical insecticides, have triggered a reduction in insect resistance levels to some chemical groups. It is vital that we protect Bollgard technology and ensure resistance does not reduce its effectiveness. We cannot afford to go back to the old chemical days.

Our responsibilities in managing this technology are significant, and must be stridently pursued, particularly refugia management and pupae control.

When determining the direct costs of Bollgard, the cost of refuge management is a significant one that cannot be overlooked, particularly as management of the refuge area for Bollgard cotton is so vital to the longevity of this technology. There are a range of management options, from 5 percent unsprayed pidgeon peas, thru to 50 percent conventional cotton not sprayed with Bt. It is absolutely imperative that we manage potential resistance to Bollgard with every tool available to us. Some of the tools available to us include proper refuge management and fallow ploughdown. The eyes of the anti-biotech world are firmly focused on our ability to manage these products, and any hiccup will set us back many years. As an industry, we have to overcome the short term temptations of short changing sound management practices such as not growing proper stands of refugia, even when water supplies are limiting and prices are down.

Failure to adhere to the best long term strategies will only hurt us in the worst possible way. The advent of resistance to Bollgard would not be able to be "rolled back", and there is nothing else in the pipeline for several years to replace Bollgard II.

It is very tempting to regard the resistance management requirements as another impost by the technology provider Monsanto. Each of us needs to remember that when Ingard was first introduced, it was Australian growers and our researchers who demanded a robust resistant management programme that limited this technology to 30 percent of our total area. Monsanto agreed to this proposal. It is also a fact that development of resistance would curtail Monsanto's profit through decreased or eventually no fees from Bollgard at all. The question is: who would be the biggest loser? Going back to a complete reliance on chemicals is not an option that anyone in this room who lived through the endosulphan and helix crises of the nineties or the heliothis plague of the seventies would ever consider.

No matter what special reason growers have for believing they are "different" to other areas, it is imperative that we conscientiously commit and adhere to the management guidelines for insect resistant cottons.

The industry also has a responsibility, to itself, to maintain some capacity to manage the crop conventionally. If, against the best advice, resistance does emerge, we would not have the capacity to grow conventional cotton if we had been 100 percent reliant on Bollgard cottons. Aerial and ground sprayers, chemical supply companies, and consultants could not cope with a sudden return to conventional cropping considering the reduction in their operations. It is vitally important, as an insurance measure, that our industry keeps some alternative capacity. By itself, this fact reinforces the need to manage biotechnology well.

It would be highly unlikely that any technology supplier, particularly those with boards based overseas, could resist the commercial temptation to increase fees for the use of their technologies to any figure that the market can bear. We have all seen this with multinational chemical companies, and it would not be unreasonable to believe it will happen again. Given Australia's position as an unsubsidized leading edge cotton producer, one would hope that that these technology providers would look for some partnership with Australian producers which would ensure our competitiveness and viability is upheld. Clearly, biotechnology is helping production in our major competitor countries like China, India, Uzbekistan and USA at very low or nil-cost, while on the world market we have to compete not only against this, but US cotton that is significantly underwritten by the US Farm Bill. US producers have their technology costs partially offset by these policies.

I would also argue that another of our responsibilities is to highlight the value of GM technology to those opposed to this technology, so that the outdated and ill-advised State-based moratoria are lifted, allowing all Australian farmers to access the benefits as we have enjoyed. A weak rural sector because of its inability to compete with current technology can only impact adversely on the cotton industry. There are few in the cotton industry who grow only cotton.

The current situation with the explosion of interest in biofuels worldwide is worth considering. Clearly, biofuels are in a state of flux with many uncertainties, but with the growing chorus of concern about the role of fossil fuels on global warming and human health, more and more attention is being given to the development of biofuels for energy. Currently, twenty percent, or 60 million tons of American corn are used for ethanol. This is increasing at a dramatic rate. It has been reported that the use of rapeseed (industrial canola) for biodiesel has increased the price in Europe by $100 per ton. At some point this must flow on into feed grain and oilseed prices. The establishment of an ethanol industry in Australia with economic plants in the 200-400 thousand ton per annum size would set feed grain prices alight. Corn that is used by American ethanol plants is genetically modified to increase starch (increased ethanol output), and includes herbicide tolerant and insect resistant traits. Will we be able to share in this potential worldwide increase in agricultural based fuel production, or will we just import ethanol and other biofuels and remain uncompetitive because we are not allowed to grow biotech crops due to the current State moratoria?

The current situation with the State moratoria and their draconian and outdated restrictions on the introduction of biotech crops is very nearly impossible for most cottongrowers to comprehend. The fact is, other farmers in Australia are specifically banned from growing and testing any biotech crops due to State regulations. As a result, research by most organizations has been severely curtailed- an outcome so-called "Green" groups have been

applauding despite the great environmental and social benefits gene technology crops provide.

Australian cottongrowers know how long the lead time is after approval to get traits into lines, and then to bring them to commercial release to suit the various cotton regions in Australia. It is also worth noting that these state moratoria are one reason stopping cotton development on the Ord. All State moratoria are to be reviewed in 2008. It is conceivable that if our industry does not stand up and be counted, that future new traits important to our industry could be included in any new moratoria. Furthermore, new or improved rotation crops may never become available. Already, our overseas competitors can rotate with herbicide and/or insect resistant corn and soybeans, with many more crops in the pipeline. At best, it will be many years before we are able to rotate or grow crops that our competitors take for granted.

Rewards _ Past, Present and Future.

Every cottongrower who was growing cotton through the nineties understands the enormity of the rewards we have already received from Ingard, Bollgard II, and Roundup Ready cotton.

- Massive reduction in chemical pesticide applications
- Cornerstone product on which to base a successful Integrated Pest Management program
- Quantum environmental improvements
- We are no longer at loggerheads with other agricultural producers – cattlemen in particular
- Collapse of community concerns of pesticides in the environment
- Virtual elimination of chippers with all OH&S concerns
- Significant control of our worst weed - nutgrass
- Improved social life for rural cotton farmers, employees, and their families

These benefits have not come without cost though. Apart from company tech fees and refugia requirements, our output prices are in a sustained depressed state because the technology is in the seed and our competition now has the same technology and ability to deploy that technology and overproduce – competition that never bothered an advanced technical producer like Australia before. Our aerial operators and chemical supply and reseller companies struggle to re-invent themselves and stay relevant.

We are currently seeing the rollout of Roundup Ready Flex and Liberty Link herbicide resistant cotton to Australian growers. Roundup Ready Flex offers full season ability to spray Roundup over the top, and Liberty Link is a new mode of action that also offers full season over the top protection.

Vegetative Insecticidal Protein (VIP) and Bollgard III are already being planned for introduction to bolster our insect resistance ability.

While commercial sensitivities often delay and prevent announcements of key advances until a product is close to release, some exciting developments we can expect or that would be possible in the next 5-10 years are:

- Drought Tolerance (crops that are more water use efficient) will give us significant yield increases with less water within just a few years
- Waterlogging Tolerance will improve irrigation efficiency
- Enhanced Nitrogen Pathways will reduce the amount of nitrogen used to produce the crop – agriculture can expect to come under significant pressure to reduce nitrous oxide emissions and this will be a key tool
- Improved Yield
- Enhanced pathways for other nutrients
- Salinity Tolerance
- Acid Soil Tolerance
- Virus and Disease Resistance will enable us to react more quickly to issues
- More Herbicide Tolerant Traits to patented and non-patented herbicides
- More Insect Resistance Traits
- Improved Fibre Quality and Quantity
- Coloured Fibre
- Cold Tolerance Traits
- Oil Modification for improved health and seed value
- Oil Quality and Yield Modification for improved biodiesel use

These, and many more undisclosed traits are being worked on by many biotech companies and public institutions around the world. It is probable that the most valuable traits are being researched worldwide by dozens of entities, and that several competing products using different pathways will come to market. With hundreds of competing patents, it is a very complex situation, and we need to show we are a strong and responsible user of the technology to enable us to command access to the best technologies at a reasonable price. Demonstrating our support for BMP is one of the vehicles that will allow us continued and timely access to new biotech traits.

However, it is not a foregone conclusion that we will automatically have access to any or all of these traits. State moratoria and international deals between our competitors may create a situation where we are excluded from access to some technologies.

What is virtually incomprehensible is that the above listed traits do more for improving the environmental performance of main stream agriculture than any other technology or system of farming, and yet influential environmental lobbies continue to frustrate the uptake of this technology. What is their real agenda? Another frustration is that those using the technology at present do not actively counter these groups, naively that technology will win in the end. Will we still be farming when technology by itself wins? Australia's State based moratoria prove that emotions and politics are mightier than common sense.

We should expect our yields to continue to rise at a rate seldom achieved by our competitors, even those not committed to environmental improvement on the scale that we have been. But we need continued access to new gene technology at its release to maintain that state of affairs.

We are at the dawn of an exciting new era, where we can nearly do whatever we can dream of. Who would have dreamt that we would not be spraying cotton for heliothis just 20 years ago? Who would have dreamt we could spray broad spectrum herbicides over the top of our crop to control weeds? We must keep our minds open to accept new developments and make them work for us before our competition can come to grips with the technology. This is how we will survive in an ever increasingly competitive world.

The Australian cottongrower has shown himself to be responsive and responsible, and to more quickly adopt any new technology than any of our competitors. We need to remain strong, responsible, and responsive so that we may reap the rewards of this exciting new era. Above all, Australian cottongrowers cannot isolate themselves over gene technology, for if they do then the capacity in biotechnology in this country will slowly diminish, and we will slip from being a leader to an also ran at best. We need to act now to ensure our economic access to new traits, new crops and rotation crops. We need to stand up and be counted to help our fellow farmers gain access to the technology they deserve.